

**III-V COMPOUND SEMICONDUCTOR AND LIGHT EMITTING ELEMENT**

Patent Number: JP9036425  
Publication date: 1997-02-07  
Inventor(s): IECHIKA YASUSHI, ONO YOSHINOBU, TAKADA TOMOYUKI  
Applicant(s): SUMITOMO CHEM CO LTD  
Requested Patent: JP9036425  
Application Number: JP19950178725 19950714  
Priority Number(s):  
IPC Classification: H01L33/00; H01L21/205, H01S3/18  
EC Classification:  
Equivalents:

**Abstract**

**PROBLEM TO BE SOLVED:** To obtain a light emitting element excellent in emission efficiency and a I-V compound semiconductor for producing the light emitting element.

**SOLUTION:** [1]. the light emitting element has a multilayer structure of a III-V compound semiconductor represented by a general formula  $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$  (where,  $x+y+z=1$ ,  $0 \leq x \leq 1$ ,  $0 \leq y \leq 1$ ,  $0 \leq z \leq 1$ ). The multilayer structure comprises a first layer 8 of n-type semiconductor, a second layer 7 doped with p-type impurities, and third and fourth layers 5, 6 sandwiched by the first and second layers 8, 7. The third layer 5 is disposed on the first layer 8 side while the fourth layer 6 is disposed on the second layer 7 side and connected directly with each other. The fourth layer 6 has larger band gap than the third layer 5 and composed of a III-V compound semiconductor having Mg concentration of  $10^{18} \text{ cm}^{-3}$  or below and [2]. a light emitting at [1]

Data supplied from the **esp@cenet** database - I2

3

L9 ANSWER 1 OF 1 WPIDS (C) 2002 THOMSON DERWENT

AN 1996-363747 [37] WPIDS

DNN N1996-306658 DNC C1996-114639

TI Layered III-V semiconductor structure - with high quality and low defect content, esp. for UV or blue light emitting element.

DC L03 U11 U12 V08

IN IYECHIKA, Y; ONO, Y; TAKADA, T

PA (SUMO) SUMITOMO CHEM CO LTD

CYC 4

PI DE 19603782 A1 19960808 (199637)\* 12p

JP 09036425 A 19970207 (199716) 5p <--

JP 09116130 A 19970502 (199728) 9p

TW 351020 A 19990121 (199926)

US 6346720 B1 20020212 (200219)

US 2002053680 A1 20020509 (200235)

ADT DE 19603782 A1 DE 1996-19603782 19960202; JP 09036425 A JP 1995-178725 19950714; JP 09116130 A JP 1996-15228 19960131; TW 351020 A TW

1996-101006

19960127; US 6346720 B1 US 1996-590574 19960124; US 2002053680 A1 Div ex

US 1996-590574 19960124, US 2001-998296 20011203

PRAI JP 1995-205954 19950811; JP 1995-16651 19950203; JP 1995-78671 19950404; JP 1995-178725 19950714

AN 1996-363747 [37] WPIDS

AB DE 19603782 A UPAB: 19970716

A new III-V semiconductor structure comprises a stacked layer sequence of  
(a) a 5-90 Angstroms thick first layer of a III-V semiconductor of formula  $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$  ( $x+y+z=1$ ,  $x, y = 0$  to 6 exclusive; and  $z = 0$  to less than 1);  
(b) a second layer of a III-V semiconductor of formula  $\text{Ga}_x\text{Al}_y\text{N}$  ( $x'+y'=1$ ,  $x' = \text{greater than } 0$  to 1;  $y' = 0$  to less than 1); and (c) a third layer of a III-V semiconductor of formula  $\text{Ga}_x\text{Al}_y\text{N}$  ( $x''+y''=1$ ;  $x'' = \text{greater than } 0$  to 1;  $y'' = 0$  to less than 1). Also claimed are III-V semiconductor structures comprising a fifth III-V semiconductor layer and the first; fourth and fifth III-V semiconductor layers and the first layer, and the fourth and fifth layers and the first, second and third layers. Further claimed are (i) a process for prodn. of a III-V semiconductor structure; and (ii) a light emitting element with a III-V semiconductor structure as described above.

USE - Used e.g. for UV or blue-emitting LEDs and laser diodes.

ADVANTAGE - The structure has high quality and few defects and allows prodn. of light emitting elements having excellent emission properties.

Dwg.0/5